

Before the  
**FEDERAL COMMUNICATIONS COMMISSION**  
Washington, DC 20554

In the Matter of	)	
Expanding the Economic and Innovation	)	
Opportunities of Spectrum Through Incentive	)	Docket No. 12-268
Auctions	)	
	)	
	)	

To: The Federal Communications Commission

**COMMENTS OF SONY ELECTRONICS INC.**

Sony Electronics Inc. (“SEL”)<sup>1</sup> submits the following comments on the Notice of Proposed Rulemaking in the above-captioned proceeding.<sup>2</sup> SEL supports the voluntary release and responsible repacking of broadcast television spectrum to provide capacity for wireless broadband services, but encourages the Commission to undertake this transition with balance and caution. As the NPRM notes, this initiative “has the potential to significantly alter the landscape of the broadcast television bands,”<sup>3</sup> notwithstanding the significant role that over-the-air television plays, and will continue to play, in the information and media landscape of the United States.<sup>4</sup> The incentive auction process cannot, and need not, expand wireless broadband offerings in a manner that cripples the use of any remaining spectrum for broadcast television service. Fortunately, as suggested in the comments below, a handful of common-sense, technical

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<sup>1</sup> Sony Electronics Inc. is a U.S. sales and marketing subsidiary of Sony Corporation, a manufacturer of consumer electronics products, including broadcast television receivers.

<sup>2</sup> *Expanding the Economic and Innovation Opportunities of Spectrum Through Incentive Auctions*, Docket No. 12-268, Notice of Proposed Rulemaking, FCC 12-118 (rel. Oct. 2, 2012) (“NPRM”).

<sup>3</sup> *Id.* ¶ 11.

<sup>4</sup> *See id.* ¶ 14 (noting that despite changes in the U.S. communications marketplace, broadcast television “continues to be a vital source of local news and information for most Americans.”)

changes to the proposed 600 MHz band plan will ensure a better outcome for broadband providers, broadcasters, device manufacturers and, most importantly, end-users.

More specifically, SEL submits the following proposals to enable the efficient allocation of spectrum to both broadcast television and wireless data services operating in the 600 MHz spectrum block, while ensuring that these services, when operating under real-world conditions, will meet consumer expectations. First, the Commission should discard its proposal to intersperse broadcast and wireless data services in the 600 MHz band, and instead allocate separate and contiguous blocks of spectrum to these services. Second, the Commission should avoid variation among the band plans for different geographic markets and should instead allocate a consistent, predictable amount of bandwidth to all services on a nationwide basis. Third, the band plan should include a single guard band separating television from data spectrum, with sufficient spacing to protect both services from undesired signals, and unlicensed devices should not be permitted to operate on these guard band frequencies. Fourth, to limit out-of-band interference, the Commission should establish transmitter mask requirements for all transmitters, fixed and mobile, broadcast and data, operating under the band plan. Finally, the Commission should look to the future of broadcast television, and use this proceeding to set aside spectrum that will facilitate the expected conversion to advanced, and more capable, digital television transmission technologies.

1. The 600 MHz Band Plan Should Allocate Separate And Contiguous Spectrum Blocks

In the NPRM, the Commission proposes to establish a wireless broadband uplink block beginning at channel 51 (698 MHz) and expanding downward in 5MHz increments depending

on the amount of spectrum reclaimed from broadcast television.<sup>5</sup> The corresponding downlink band would begin at channel 36 (608 MHz) and expand downward in 5 MHz increments, again depending on the amount of spectrum reclaimed.<sup>6</sup> Interspersed between the uplink band and Channel 37 (614 MHz), as well as below the downlink band, the Commission would retain existing broadcast television services, each separated by a proposed 6 MHz guard band.<sup>7</sup> This proposal would enable a 90 MHz duplex gap between mobile broadband uplink and downlink. The NPRM contends that this approach would provide as much certainty about the operating environment as possible, while ensuring that spectrum blocks remain as free from interference as possible.

SEL urges the Commission to reject this approach, because it would introduce unnecessary complexity in both television and wireless broadband receiver design, thereby increasing receiver cost and diminishing reliability. Television receiver manufacturers would be required to design products to reject undesired signals from both downlink and uplink transmitters. Doing so would require a combination of a low pass filter at the lower edge of the downlink plus a band pass filter around the section of TV band between the downlink and uplink. Consumers affected by interference from mobile transmitters would need external filters to connect inline between their antenna cable and the television. Such complex filters are also likely to have a larger insertion loss which reduces the television transmission coverage area.

Wireless handset manufacturers would need to design products to reject interference from television transmissions into the broadband downlink. The proposed band plan would also, however, require handsets to use more power to overcome any potential interference from

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<sup>5</sup> *Id.* ¶ 126, and Figure 4.

<sup>6</sup> *Id.*

<sup>7</sup> *Id.* ¶¶ 156, 158.

television transmissions into the wireless uplink. Although the large (90 MHz) duplex gap may facilitate the duplex filter design for wireless handsets, any benefit from the proposed band plan would likely be outweighed by the cost of this additional functionality.

In addition, the proposed band plan would unnecessarily require multiple guard bands – between the lower television channels and the wireless downlink, and between the upper television channels and the wireless uplink. These guard bands would be unavailable for licensing, but would potentially host unlicensed transmitters. Given the Commission’s policy goal to maximize available spectrum for licensed broadband operations, and the need to make the most efficient use of scarce spectrum resources, it seems wasteful to dedicate the amount of spectrum to guard bands that the proposed band plan would require.

Accordingly, SEL recommends that the Commission allocate separate and contiguous spectrum blocks for television and wireless broadband services, consistent with the alternative approach suggested in the “Down from Channel 51” alternative band plan proposal.<sup>8</sup> Under this alternative approach, wireless data uplink would again begin at channel 51 and expand downward depending on the amount to spectrum reclaimed, followed by a smaller duplex gap, and then the wireless downlink. A single guard band (or Channel 37, if sufficient spectrum were to be recovered) would protect the wireless downlink from adjacent television services and vice-versa. This approach would greatly simplify the design of filters for both televisions and for mobile handsets, and would limit the need to reserve unlicensed spectrum for an additional guard band. Although this proposal would require reservation of a duplex gap separating uplink and downlink, existing wireless broadband deployments show that this gap could be as small as 11 MHz with today’s technology.

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<sup>8</sup> *Id.* ¶ 178.

## 2. The Commission Should Avoid Geographic Variation Among Band Plans

Similarly, SEL encourages the Commission not to adopt its proposal to accommodate non-uniform amounts of relinquished spectrum for allocation to wireless uplink in different geographic markets.<sup>9</sup> Under this arrangement, spectrum allocated for wireless uplink in certain areas would be allotted to television channels in other areas, and would require both television and wireless handset manufacturers to adopt one of two equally untenable solutions to ensure that devices could operate properly.

First, manufacturers could design and sell different devices, with different receiver characteristics, for different markets, based on the local operational environment. Assuming that it would even be possible for a manufacturer to ship one handset for consumers in New York, a second, slightly different receiver in St. Louis, and a third in Phoenix, the loss of economies of scale in designing and producing these products would dramatically increase the cost to consumers. Both television and handset economics are premised on the existence of a single national market, and SEL, like most manufacturers, would strongly oppose any change to a market structure that has delivered so many consumer benefits to date.

Alternatively, at least in theory, a television or handset could be designed to recognize its operating environment and transmit, receive or reject signals based on the environment to which it is exposed. SEL is not aware of any currently available variable filter technologies capable of enabling this functionality in consumer products. Even if such a technology were to be invented, it would likely prove impossible to devise a method for testing it under widely variable real-world conditions and across a large-scale deployment. The Commission should avoid developing a band plan around any such hypothetical solution.

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<sup>9</sup> *Id.* ¶ 136.

SEL believes that the best solution is the also the simplest. Consistent with the separate and contiguous spectrum allocations described above, the Commission should simply abandon its proposal to create different band plans for different geographic areas, and instead should require the same amount of spectrum to be cleared in all markets.

3. A Single 6-8 MHz Guard Band Should Separate Data And Broadcast Transmissions

As described above, SEL advocates a band plan that would require the allocation of only a single guard band to protect broadcast television and wireless broadband services from each other. Unfortunately, given the limited availability of real-world data on adjacent television and wireless broadband downlink environments, there is insufficient empirical data to determine the precise amount of guard bandwidth needed for adequate protection. In the experience of SEL's Europe-based sister companies, a 1 MHz guard band has proven to be clearly insufficient. Based on experience in Japan, SEL notes that a guard band of 8 MHz might suffice, but this question demands additional empirical study. SEL recommends further controlled testing, with clearly specified measurement conditions. SEL further notes that this matter is under active study in ITU-R by the JTG-4567 study group.

It is important to note, however, that for any guard band to provide effective protection for adjacent services, the Commission must not permit the operation of unlicensed devices in this spectrum. Introducing an unknown and unknowable number of variable transmitters into this protected allocation would almost certainly have negative consequences on licensed services, and at a minimum would render meaningless any conclusions about appropriate guard band size.

4. Transmitter Masks Are Necessary To Prevent Undesired, Out-Of-Band Interference

As a final technical matter, SEL recommends that the Commission clearly define transmission masks for all operations under the new 600 MHz band plan, both television and wireless data, and for both base stations and mobile devices. Defining transmission masks would enable the definition of interference limits for television into wireless data services and vice-versa. In addition, SEL suggests that the Commission collect data to develop a specification for out-of-band emissions by these services, and also collect empirical data aimed at specifying power limits for these transmitters.

5. The Commission Should Reserve Spectrum to Facilitate the Conversion to More Advanced Digital Television Standards

Finally, SEL encourages the Commission to use this proceeding to begin planning for the future of broadcast television. As the Commission is aware, the current terrestrial broadcast transmission standard, ATSC A/53, began development over twenty years ago. As such, this standard incorporates technologies and designs that were achievable at the time, but which are now showing their age. Newer, more capable technologies are under consideration worldwide, including here in the United States at the ATSC, where development of the so-called ATSC 3.0 is approaching completion. These new technologies will enable the introduction of new features and functionality, including 4K Ultra High Definition.<sup>10</sup> Moreover, these technologies will be capable of adapting to changes in service and technical requirements and, thus, will be equipped for sustained service development, evolution, and growth. Unfortunately, these modern

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<sup>10</sup> The Consumer Electronics Association (“CEA”) defines the Ultra High Definition image as being at least 3840 pixels wide by at least 2160 pixels high, four times the resolution of full 1080P High Definition.

broadcast technologies are not backward-compatible with the current ATSC standard. To avoid the consumer disruption that would result from a “flash-cut” from the current standard to the next, SEL urges the Commission to make an appropriate provision for transition spectrum in its band planning.

## CONCLUSION

SEL commends the Commission for undertaking this challenging, but promising, initiative to restructure spectrum usage in the 600 MHz band, and hopes, consistent with the concerns and solutions proposed above in these comments, to serve as a useful resource in this process as it moves toward conclusion.

Respectfully submitted,

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